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ABSTRACT

This unit of the Flexible Learning System (FLS), designed for adults working with children aged 4-8, is concerned with sensory experiences to promote learning in the early childhood years. Texture, weight, size-shape, taste, hearing, and sight are explored in a sequence of learning activities repeated for each sense mode. The learning-activity sequence involves participating in an adult sensory experience, constructing a sense-word list, exploring and constructing learning objectives for children, diagnosing sensory skills in children, and creating sense-modality learning experiences for children. Learning objectives for children incorporate experiences in naming, matching, comparing and contrasting, classifying, ordering, describing, identifying, tracing, predicting and explaining. The diagnosis of individual children's conceptual use of sense is explored in the context of natural observations and adult probes during normal classroom activities. Individual and small group activities, classroom observations, and work with children are integrated to achieve skill in promoting cognitive growth through sensory experience; skill in diagnosing the child's conceptual use of senses; skill in using diagnosis to plan and provide sensory activities that support cognitive growth; and the development of a sense perception curriculum. Related FLS units: "Exploring Children's Thinking"; "The Growing Mind"; "Working with Children's Concepts"; "Using Toys and Games with Children." (Author/SB)



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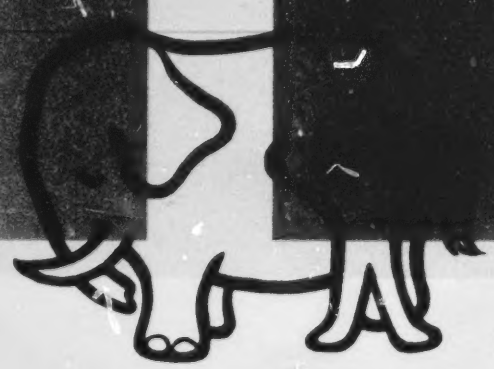

# developing children's sense perception

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THE FLEXIBLE LEARNING SYSTEM—COMPETENCY-BASED LEARNING UNITS FOR ADULTS IN EARLY CHILDHOOD EDUCATION

# Developing Children's Sense Perception

Preschool - Third Grade

by

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# CHAPTER I. WHAT THE LEARNER'S GUIDE IS ABOUT

## Why Sense Perception?

This guide is about sense perception. It is a learner's guide for you as a teacher of young children (preschool through third grade). If you follow it carefully, and are able to complete the competency tests, you should be able to plan and carry out a rich program of sense experiences for the children in your classroom. You should also be able to identify and extend the cognitive development that takes place through sense experiences in your children.

Sense perception sounds like a rather straightforward subject. It involves the five senses (touch, taste, smell, hearing, and sight). It's clear that these are important sources of information about the world outside (as well as within) us. If you simply imagine yourself without one or two of them, it will be easy to realize just how much you rely on them. It's also clear that this information about the world comes in through the sense organs--eyes, skin, ears, nose, tongue. What's not quite so simple is just how this whole process works, and what part the brain plays in it. We will talk more about this later in Chapter I because some background on the working of sense perception will be helpful in better understanding how your children learn through sense experiences.

Another question you might raise about working with a handbook on sense perception is, "Why teach sense perception skills anyway?" Children are naturally curious, and use their senses a great deal with or without adult intervention. (Can you think of any form of curiosity that doesn't involve the senses?) But the senses are a tool, and like any tool, they benefit from skilled use. So work with sense perception skills is important in making that tool more effective, more efficient, and more satisfying.

The section in this chapter that covers the relationship between the use of the senses and cognitive development will give you more specifific information about the skills that you teach through sense experiences.

For now, though, it's important for you to know more about the goals of this guide, and the kinds of experiences you will have in working through it.

## Goals of this Guide

These are the goals of the learning unit, Developing Children's Sense Perception. They may sound like a lot of very general statements, but you probably already feel familiar with and perhaps quite confident about many of these areas. Also, the guide is designed to give you very specific background and experience in working toward the goals. Besides, with the help of the instructor, you'll move ahead easily.

1. To recall and expand for the learner sense awareness experiences and the need for attention to and valuing of them at the adult level.

2. To increase the verbal sense "vocabulary" of the learner.

3. To develop the learner's ability to provide sensory experiences that develop cognitive skills.

4. To develop the learner's ability to diagnose the child's conceptual use of sense, particularly in these areas: observing, naming, matching, sorting, grouping, ordering, classifying, and "wanting to know about."

5. To develop the learner's ability to use this diagnosis to plan and provide sensory activities that specifically support and extend the cognitive growth of individual children.

6. To enable the teacher to develop his or her own curriculum for sense perception, using checklists of behavioral (or other types of) objectives, wordlists, sensory activities, diagnosis, observation, and individualized follow-up (prescription).

7. To begin very minimally to expand and sharpen the learner's ability to organize experiences for young children that will develop higher-order cognitive use of sense perception and experiences (i.e., to predict, explain, isolate causes, make generalizations).

## Kinds of experiences you will have in working through the Sense Perception Guide

This guide is designed as a competency based learning unit; that means that you or your instructor should be able to check at each step whether you are sufficiently able to use the material. That means you can't go on to step 2 until you can demonstrate that you fully understand step 1. It also means that we've tried to be very clear about the learning objectives for each chapter, so you know what you're expected to know by the time you finish it. Chapter I is an introduction to Sense Perception. Chapter II is a little different because it is a general tuning in to your senses and is planned for you as an adult learner, rather than for you as a teacher. That is, the activities in it are not meant to be used with children, except

perhaps indirectly or in modified form. Chapters III through VI, however, each have a set of objectives at the beginning and related exercises for demonstrating competency at the end.

In working with this guide, you will be in a variety of learning situations. Some will require:

1. that you work by yourself, with an instructor, with one or more other adults, or with one or more of the children in your classroom

2. that you read and think quietly; active participation with materials at home, in school, or wherever you meet with the instructor, field trips, etc.

The kind of learning experiences you will have in this guide are directly related to the goals just outlined. They will include:

1. "Doing" activities that expand and recall sense experiences and sense vocabulary, and that make one aware of one's adult use of the senses and of the relationship between thinking and sensing.

2. Some discussion of sense modes, and the extent to which different children draw more heavily on one sense than on others.

3. Using and eventually working to develop a checklist of objectives for or a curriculum of sense perception that is appropriate for children in preschool through third grade.

4. Using and eventually designing (your own) diagnostic techniques based on the checklist objectives, to determine where individual children's needs lie in developing: (a) general experiences using a particular sense, and (b) skills for thinking about sense data.

5. Distinguishing vocabulary limitations in assessing children's sense perception skills.

6. A written assignment to be discussed with the instructor and used in part to determine competency.

7. Exercises for checking yourself against the guide's objectives (competency tests).

More about the learning experiences in this guide:

Chapter III will provide for you the list of sense words, a behavioral objectives checklist, the diagnostic procedures, and some sense experiences to be used. Each successive chapter will increasingly rely on you to contribute and to eventually design for yourself the checklist, diagnostic procedures, and sense experiences. That may seem like a lot to ask, but the guide will give you specific models for each of these, and lots of help. You won't have to do it all at once.

**Sense Perception: A system of sensing and thinking**

We said before that the five senses are an extremely important source of information about the world,

and that this information comes in through the sense organs. (See pages 1 and 2.) This seems reasonably clear. What's not always so clear is what happens to this information once it gets picked up by a sense and the form of this information. Though a whole set of nerves, as well as the sense organs themselves, are involved in picking up and delivering the raw data, there's a different system that makes use of the data, processes it, or interprets it. How well we use the raw data picked up by the sensory system has to do with the brain, or the part of the brain involved in thought. This is all elementary; you've known something about it since elementary school. But it's also so subtle and complex that a lot is still unknown about how vision, for example, works.

But it's important to know a little about the way sense perception works physiologically. Suppose you have a group of children who are having trouble sorting materials of different texture. You think to yourself, well, they need more experience with texture--touching and maybe looking at textures--because their sense of touch doesn't seem to be very sophisticated yet. Now you're on the edge of trouble. You have the right plan of action--more experiences with touch, but the wrong reason behind it. Because it's probably not the way their skin functions as an organ of sense. They may feel a lot of differences (though with some sense problems, there are physical limitations like lack of fine or gross motor control). The raw data may be coming in quite reliably through their sensing mechanism.

What's lacking is a thinking process to make use of or to organize the information coming in. A few weeks and many textural experiences later, you are excited to notice some change in their use of those texture materials; the children notice or compare things more, or can group similar textures, or sort them according to some quality. So it's something in the brain and the way it works that you're excited about, not the development of the sensory organ itself. That's really important to keep in mind throughout this guide. What we are doing in developing "sensory perception" is not improving the operation of the eyes in relation to seeing, or the ears in relation to hearing, but increasing the capacity of the mind for receiving and using the raw sense data sent to the brain. (You might recall here, too, that the brain also sends out instructions to the sense organs, in order to get back new or different information.) Thus, we work with children in sense perception to develop those same skills that get applied directly to "math" or "science" or "language arts": the capacity to pay attention, to notice, to observe, to compare and contrast, to classify, to predict, to isolate, and to make generalizations about what their "senses tell them."

Now you've "heard" the idea repeated in several different ways, and that's an indication of how important a point it is. In this guide, we are working on developing children's thinking through the use of lots of sensory experiences, each of which gives the child's mind new sources of information about the world he or she lives in.

## Check-up I

This is the end of Chapter I, which is your introduction to this guide on Sense Perception. It would be a good idea to go back and make sure you are clear about: (1) the goals of this guide, (2) the kinds of experiences you'll have in working through it, and (3) the relationship between the sense and the thinking process. There are no competency tests for this chapter. Instead, to give yourself an idea where you're starting from, write down here a list of ways that children use their senses (and their brains) to learn about the world.

| Touch | Taste and Smell | Hearing | Vision |
|---|---|---|---|

This list is not for your instructor unless you want to share it or ask some questions about it. It is for you to go back to later and see what new ideas you've gotten as you work through the guide. Don't be afraid to make notes on whatever comes to mind.

# II

# CHAPTER II. OBSERVATION OF THE SENSES

## Getting ready to think about Sense Perception and Young Children

This chapter should be fun. As you can see from the title, we're not yet into the thick of things. The experiences you'll encounter in Chapter II are designed for you as an adult learner.

First, you'll have one extended experience with the use of the five senses: touch, taste, smell, hearing, and vision. We call it a "sense walk." The purpose of the "sense walk" experience is to give you more information about your own use of these senses, which you can later apply to the development of sense perception skills with children. You'll also be asked to do an observation of children using material rich in sensory experiences (that is, "messy"). The handbook will give you guidelines for the observation.

## Objectives for this Chapter

1. To be able to use the sense experience ("sense walk") to increase your own sense vocabulary, and to pay increasing attention to sense awareness.

2. To be able to name, describe, and classify a variety of sense perceptions according to criteria to be presented in the information on the "sense walk."

3. To be able to identify the cognitive skills children are using while engaged in a primarily child-directed experience with sense-"rich" materials such as clay, water, sand, or cooking ingredients (often regarded as "play" activities).

## Sense Walk

The purpose of the sense walk is to recall and expand your own sensory awareness as a preparation for working on sense awareness skills with children. Most of us have too little time for paying

attention to and taking pleasure in touch or taste or sound. Every once in a while there's a really lovely sunset, or you actually listen to the sound of water rushing into the bathtub (instead of wishing it would fill up the tub faster). So much is coming in through the senses most of the time that only a small amount gets conscious attention. But by deliberately changing the focus of your attention, or by somehow simplifying the environment, you can rediscover sense pleasures. As a teacher, you need to know that those pleasures (like the children messing with clay) are also serious and important to thinking as well as making someone feel good.

So although this chapter is meant to be fun, it's also meant as a serious part of your training in sense perception. The most important direction we can give you for doing the Sense Walk is that you enjoy it at the same time that you are putting real effort into it.

Directions for the Sense Walk

You'll work on this exercise with a partner, either your instructor or another learner.

You are going to be doing two sorts of exercises. One is a blindfold walk, in which you will focus on using all your sense except sight. Before you go on the blindfold walk, you'll have a chance to use your visual sense to gather information. Take writing materials. Go to a nearby park, vacant lot, or other quiet nature area. When you arrive, find a comfortable place to sit. Take out writing materials, and do the following:

Step 1. Pick out three objects you can see from where you're sitting. Write down at least five, but use as many words as you can that describe (but do not name) those objects. Use the visual sense only.

Did you include information about size (small, huge, tiny)?

Shape (regular, irregular, triangular, jagged)?
Color (dappled, mottled, deep, glossy)?

What about the direction or level of the objects (low, southwest, adjacent, perpendicular to)?

What sort of structure do your objects have (layered, crystalline, branched, tubular)?

As you look over that list of word suggestions, notice how sophisticated our language can be in describing what we can see. Behind those words lie a rich experience with vision and the mind's careful organization of those experiences.

Step 2. Now write down at least ten words or phrases that describe your location, using only the visual sense for clues. Remember that location is always in terms of some scale or point of reference. Try to list a visual clue for several of the following points of reference:

a. the type of terrain you're in (hilly, desert, woodland, etc.)

b. how close you are to a road

c. how close (or far) you are in relation to an urban center

d. your direction with reference to where you entered this place

e. where you are in relation to north

f. how far you are from the equator

g. the country you're in (If you somehow lost track of time and the events of the last day, how could you tell from visual clues that you were still in the same country?)

h. what planet you're on (any visual clues that establish that you're really on planet Earth?).

Remember to use visual clues only. (It's not fair to say you know you're near a city because you can hear lots of cars.) You may find Step 2 hard. That's okay, for it's meant to be a little provoking. You and you partner should do Steps 1 and 2 of the Sense Walk at the same time. You can compare notes if you want to, but try to keep your lists separate.

Now put those notes away and get ready to think about the blindfold walk. You've been concentrating very hard on your visual sense, so it should be a distinct shift. You're going to focus on two things during the blindfold part of the Sense Walk:

1. Using your senses (except sight) to identify things that are around you.

2. Using your senses (except sight) to tell you your location.

There's nothing there that sounds too strange, is there? Good, because it should be fun, and a little challenging.

Step 3. Choose which person will be blindfolded (flip coins, draw straws, pull rank, or whatever method works) and which one will lead first. Before placing the blindfold, let the person look around the area. At this point you can do one of two things, depending on how adventuresome you are. Either lead the blindfolded person to a new location or stay in the same location, but walk the person around so he or she is in a different relationship to the things around them. Then follow the directions for Step 4.

Step 4. This exercise is very much like Step 1, except now the blindfolded person will be using all senses except sight. The blindfolded person will find three objects and do the following for each object:

a. Name the object (or make a good guess).

b. List any sense clues that are used for the identification and/or that seem distinctive (smell, taste, sound, touch).

Your partner will record these under the proper sense categories, as indicated on the next page. Partners can discuss any questions about what to record and where. The main purpose is to collect information about each person's use of the senses in the blindfold situation. You might want to try to locate the same three objects you chose for the visual description (Step 1), but it's not necessary.

IDENTIFICATION CLUES SHEET FOR RECORDING

| Object | Touch | Taste | Smell | Sound |
|---|---|---|---|---|
| 1. | | | | |
| 2. | | | | |
| 3. | | | | |

Go on to Step 5 as soon as you finish recording identification clues for all three objects. (The first person will go through the whole blindfold walk before you switch places.)

Step 5. This is a location exercise like the one in Step 2, only you aren't going to be able to rely on visual clues. You may find it difficult; in our culture there aren't too many situations where you have to locate yourself without using visual clues. (A good way to make that point to yourself some time is to list clues that are regularly used--road signs, maps, trail markers, etc., and notice how visually oriented they are.)

What you're going to do if you're the one who's blindfolded is to list all the touch, taste, smell, and sound clues you can pick up about where you are. Remember the point we made in Step 2 about the need for a point of reference in establishing location? Your partner is going to help you by reminding you of several possible points of reference. The list appears just below these directions. To give you an example, though, your partner could say, "give me any clues you pick up for what kind of terrain we're in." And the blindfolded person might say, "Well, from the mud I've got all over my shoes, I'm pretty sure we're in a swamp." It's up to the partner who's recording this information to keep you both out of real trouble. It's also up to the recorder to put the clues in the appropriate sense categories--or else to ask the blindfolded person whether the clue is one of touch, or smell, or whatever.

## LOCATION USING ALL SENSES BUT SIGHT

| Reference Point | Touch | Taste | Smell | Sound |
|---|---|---|---|---|
| 1. type of terrain | | | | |
| 2. how close to a road | | | | |
| 3. how close to an urban center | | | | |
| 4. type of climate you're in | | | | |
| 5. location with reference to where you entered this place | | | | |
| 6. the country you're in | | | | |
| 7. how do you know you're on planet Earth? | | | | |

Now the first person has finished the blindfold walk. Take off the blindfold and look around. For your own curiosity, you may want to compare what you see now with the impressions you got from your other four senses.

Step 6. Change roles now and repeat Steps 4 and 5.

Step 7. When you finish the Sense Walk, you're ready to go back to your school, or a nearby coffee shop, or someone's house to look over the results. Here are some ways to use the exercise you've just done, to further expand your action and your verbal sense "vocabulary."

Note: The exercise you've just completed is meant to expand what we call a sense "vocabulary." This vocabulary has two forms: one literally of words that convey sense information; the other a vocabulary of actions, the actual use of your five senses to gather information.

**Additional exercises based on the Sense Walk**

1. Look over the words you listed as clues to the identity of three things in your environment. Add to these your list of words based on visual clues. Now see what happens if you rank the five senses according to which you found most useful in identifying (or describing) those objects. How does your list compare to your partner's? What do you think you might conclude if the lists are similarly ranked? Are the lists similar at the beginning and end (highest and lowest preference), but more distinct in the middle area? What does this suggest? Can you think of situations where smell would become an extremely important sense for gathering information?

2. Now go through the list you made of words describing your location (be sure to add your visual clues to this). Which sense seemed most useful to you in determining or describing your location? Rank the five senses in order of importance (you could do this according to the number of words listed for each sense, or by some other scale, such as your own conviction that one sense provides more information to you than another). Compare your ranking to your partner's. Do you feel any strong preference for one sense over another? Describe a situation in which the sense of sound would become really critical in determining location.

**Preferred Sense Mode**

There's a great deal of recent research about individual differences in reliance on each of the senses for information. Much of this research centers around what is called "preferred sense mode" in relation to learning. Quite simply, this is research to determine whether children show a pattern or preference for one or more of the senses in their approach to learning. For example, one child seems to be able to learn the words of a song better through hearing them than seeing them. Or one child may show a preference, or greater need, for touching the letters of the alphabet, whereas another may need to work with the sound of the letter, or work on recognizing letters by sight.

Of course, it's not quite as simple as all that. The problem is to figure out why one approach works better than another. The child who can identify letters by touch may have a better developed set of concepts (naming, matching, discriminating, sorting, etc.) connected to touch than, say, to vision. But on the other hand,

there may also be a particular obstacle to the visual information --the letters may be too far away, or printed smaller, or appear not so attractive. But let's say that you've got all those variables under control, and a child shows a pattern of preferring to find out things with her hands rather than with her eyes or ears. That seems like useful information that a teacher could use in a couple of ways. First, you as the teacher might decide to make tasks easier for that child by introducing new or difficult ideas through work with the preferred sense. Sometimes, that alternative might be really useful. Another way to help would be to emphasize the senses that the child doesn't use in as sophisticated a way, so as to strengthen the cognitive tools for using those other senses. Like any other part of teaching, the real skill is in knowing when to work from strengths, and when to support and strengthen weaknesses. Pay some attention to children's preferences for putting their senses to use, and you've got another tool for your teaching kit. Don't forget, by the way, that preferred sense mode mostly concerns how the thinking brain uses what comes in through that sense, and not how well the sense itself is operating. The eyes may be seeing those letters very clearly, but the thought process can't cope with all those fine little squiggles and lines.

Your own experience during the Sense Walk may give you some more insight into preferred sense modes.

An Exercise in Observing Children Involved in a Sensory Experience

In this exercise you will observe a small group of children working with a sense-rich material such as clay, sand, or water. The purpose of the observation is to make you more keenly aware of the way in which children explore through their senses, and how this exploration is used in cognitive development. Arrange with your instructor to observe a group of about five children, preferably in your own classroom. Set up on of the following experiences: water play, sand play, clay, or making butter (you only need something to churn in and some heavy cream). You may have done these sorts of activities with children many times; but the point this time is to observe their behavior very carefully, according to the directions that follow. If you have sand or water play in your room as an ongoing activity, you may want to use that for your observation. You can even make discoveries about something very familiar by paying special attention to it.

Directions for the Observation

You should allow yourself ten minutes of uninterrupted observing. If this seems impossible, try two sessions of five minutes each. It's really important to observe continuously over a period of time, so you can see the direct development of ideas and actions. Write down as directly as you can any conversation or actions that you think relate to these aspects of cognitive development:

1. naming of objects
2. sorting of objects
3. matching of objects
4. comparing and contrasting one object or experience with another

5. classifying or grouping of objects or experiences

6. predictions or explanations of why things behave the way they do.

Obviously, you will be able to write down only a minute portion of the thinking that actually goes on, but get down whatever you can (the children's exact words are often significant in telling you what they are really perceiving).
As soon as you can (either while you're observing or right after) jot down next to each observation the name of the sense organs (sense mode) that you think were primarily being used in providing the child with data (and motivation) for the cognitive process you identified. (If possible, you might do your observation with another person, or your instructor, so that you can compare notes.) Before you meet with your instructor, take your notes and transfer them to the chart that follows, so you can get a schematic picture of the cognitive skills that were used.

| Cognitive Skill | Conversation | Action | Sense Mode |
|---|---|---|---|
| 1. naming of objects | | | |
| 2. sorting of objects | | | |
| 3. matching of objects | | | |
| 4. comparing and contrasting one object or experience with another | | | |
| 5. classifying or grouping of objects or experiences | | | |

6. predictions or explanations of why things behave the way they do

Discussion with Instructor

Now that you've done all this writing, take it to your instructor and get some feedback. Your instructor will talk with you about your observations and the way you've filled out the chart. Do your notes suggest any follow-up activities, or tell you anything about individual children and their cognitive skills? Do you notice any patterns of perception in the group or in individual children--any greater attention to one sense than another? Which sorts of thinking skills seem to occur most frequently? Which least? How much goes on that involves several thought skills at once?

## Check-up 2

Write a one-page comment about how you were affected by the Sense Walk, both as an adult learner and as a teacher of children. Did you notice anything about your responses that was quite different from your partner's? How do you feel about your use of each of the five senses? How does your cognitive use of your sense data differ from that of the children you observed?

# III

## CHAPTER III. TOUCH

### Objectives for the Learner

After working through this chapter, you should be able to:

1. Give an experience in which you have used the sense of touch, list the skills you used that relate to sensing texture, weight, shape, and size.

2. Give a behavioral objective describing a touch skill, modify it to make it easier or harder.

3. Give a diagnostic test for a particular touch-skill, use it to find levels of skill for children in your classroom.

4. Give a description of a learning experience for children that uses the sense of touch, create that learning experience for children in your classroom.

The above four objectives are "teacher-objectives" in that they describe skills that you need as a teacher to use some sense perception materials. In this chapter we are mostly concerned that you become comfortable with using learning materials that others have developed. But in following chapters, we are going to place more and more of the responsibility on you for the creation of learning experiences. In this chapter, we are serving as a model for you. Gradually, in succeeding chapters, we ask you to adopt (at least for the purposes of this training) our model for yourself.

Besides the four "teacher-objectives," we have a more general attitudinal objective--we want to "turn you on" to touch. We hope that as you work through this chapter, you will start meeting the world with newly sensitized skin; touching, rubbing, stroking the myriad textures around you.

## General Plan

We decided to start working with you here on using the sense of touch with young children for two reasons. First, it is a rather neglected area of sense perception. Second, it is difficult enough and rich enough to serve as a good model for teaching sense perception.

If you start to collect words about how things feel--words like sticky, coarse, curved, heavy, hairy, angular, velvety, dense, light--you might find that they sort well into three categories. We call these:

texture

weight

sixe and shape

(Convince yourself that most touch words can fit into one of these groups.) Accordingly, this chapter begins with three parts, one for each of these categories of touch. That way, you get to run through three times the steps of having a touch experience: developing a wordlist, developing a checklist of objectives, and studying the objectives for ways to make them more or less difficult. Don't worry if these steps don't make sense now; they probably will after you have been through them three times.

The last two parts of the chapter deal with (1) developing and using diagnostics for the sense of touch; and (2) developing and using more touch-focused learning experiences for the children you work with. At the end we'll give you a chance to test yourself against the objectives set for you at the beginning.

## Texture: Oobleck-A touching experience

This chapter starts messily and sociably. You need to work either in or near the sink area of your classroom or in your kitchen at home. Don't work alone! It's not dangerous but it's about three times as much fun with one other person, and fifty times as much fun with two or more. Try it with your co-workers, or with your family, or at a party. Oobleck is amusing, challenging, and quite different.

Here is what you need:

a box of cornstarch

at least one large container (about the size of a shallow dish pan)

newspaper to spread around to make clean-up easier (but don't worry if oobleck gets on things; it comes off easily with water)

a small container for pouring water

food coloring to make colored oobleck (optional)

Now, to make some oobleck, dump about half the box of cornstarch into the large container. With the small container, slowly add water, mixing with you hands all the time. By the way, isn't the texture of dry cornstarch interesting? Continue slowly adding water and mixing until you get something that is thick and smooth and feels very strange to touch. This is oobleck! Did you add to much water and get something thin and soupy? Well, dump in more cornstarch until you get oobleck back. If you like, add some food coloring.

Now that you have oobleck, play with it. The main idea here is just to enjoy the feelings and the process of discovery of all the strange things that oobleck can do. Don't give up too soon. Can you sculpt with oobleck? Break it? Pour it? Poke it? Dry it? Paint with it? Dilute it? Thicken it?

When you get all ooblecked out, take some time with your friends to make two lists. We need the first list for the next activity, and you will need the second list when you do oobleck with children. The first list should show what you felt while working with oobleck, both with your skin and in your head. The second list should include ideas and feelings that you all discovered about oobleck, such as "You can't sculpt with oobleck." (Or can you?) You may find you get into some interesting arguments about these discoveries. Duplicate the list of feeling and touch words here.

**A Texture Wordlist**

Playing with oobleck gets you involved with the textures of an unusual substance. Here is a list of words describing textures that might come from working with many different substances. Add your oobleck texture words to the list if they are not already present.

soft
hard
slippery
smooth
wet
gooey
sticky
coarse
fine
rough
bumpy
sharp
crumbly
solid
silky
dry
grainy
cracked
wrinkly
powdery
hairy
lined
jagged
metallic
resilient
oily
dull
velvety
tacky
oozing
mucky
squishy
prickly
plump
feathery
gauzy
slick
clinging
fuzzy
spongy
leathery
woolly

Generating a wordlist like the one above, besides being fun, is a good way to get started thinking about a set of learning experiences. It can help you focus. It is not a vocabulary list to teach to children, although many of these words will occur in your work with them.

You need to do some work with the texture wordlist to get the words into your active vocabulary. They are inside us because we thought them up; now you need to get them inside you. (In Chapters IV through VI, you will be the one to do the work of generating wordlists.) Think of some way to sort the words in the wordlist into two or more groups. Then sort them, using the space below. You may not have a title for your groups at first, but you should have names for them by the end. If you get absolutely stuck and have no ways to group them, here are two ideas: (1) textures that can apply to liquids, and textures that cannot apply to liquids; (2) smooth textures, rough textures, and textures that are neither rough nor smooth.

## Developing a Checklist of Objectives for Texture

Now you've had a learning experience with textures, and you've explored some texture words. What's next? Well, it's time to start thinking about children. How good are they already at perceiving and describing textures and what additional skills do you want them to develop?

We attack this problem by constructing another list, this time a list of objectives. We use objectives because they force us to be very clear as to what we are talking about. Also, such objectives readily suggest both diagnostic tests that we can use to learn about children and new learning experiences for them. You will see as we go along what we mean by these statements.

The wordlist suggests that there are actually many different textures. So children should be able to discriminate among them. The wordlist also suggests that there are various degrees of difference between these degrees (that is to order them). They should be able to use some texture words both by sorting objects into labeled piles of textures and by using the words to describe objects. We want them to identify objects with different textures, and we want them to be able to form their own classification system for objects based on textures. These skills all can be appropriate to preschool through first-grade children. The list below restates these skills very carefully. Read each objective, trying to imagine how you would check either yourself or a child for the described skill.

Texture Objectives

The child should be able to:

DISCRIMINATE
1. Given a bag ful of textured materials and an identical set on the table in front of him, feel one of the objects on the table and find by touch alone the matching object in the bag.

ORDER
2. Given one piece each of metal, wood, rubber, felt, and cotton, place them in a line in order from hardest to softest.

ORDER
3. Given four squares of different grades of sandpaper, place them in order from coarsest to finest using touch.

SORT
4. Given an assortment of materials with different textures and a

pair of labels (examples: rough and smooth; slippery and not slippery; wet and dry, fluffy and not fluffy, hard and soft) sort the material into two piles, one for each label.

DESCRIBE

5. Given an object, use at least two texture words when asked to tell how the object feels.

IDENTIFY

6. When given a texture word like hard, smooth, coarse, wet, etc., be able to pick out in the room some object that has that texture.

CLASSIFY

7. Given a set of materials with different textures, be able to sort them into two or more piles according to how they feel and to give a name to each pile.

In the Oobleck activity, only one of these objectives was of prime importance. Which one was it?

Which of the texture objectives does not ask the child to use any texture words (except those he or she may think up alone)? In the rest of the objective, is there any way to tell whether a difficulty is related to understanding words or perceiving textures?

**Making objectives in the Checklist more or less difficult**

Look again at the first of the texture objectives on the previous page, the one about matching textures in a bag with ones on a table. (By the way, all the textured materials should be the same size and shape. Otherwise how do you know if the child is using the texture or some other clues to pick out the right object? One way is to make "texture plates," 10cm x 10cm squares of cloth, foil, paper, wood, etc. glued to heavy cardboard for backing.) One question that will occur to you as you think about applying this objective in the classroom, "Is this skill too hard (or too easy) for the children I work with?" How do you tell? Actually you can't tell yet! You need to know exactly what materials are in the bag.

Consider three different sets of materials found in three different bags. In which bag do you think it would be hardest to discriminate the materials? In which the easiest? (Write your answer next to the bag.)

Bag A

| | |
|---|---|
| cotton cloth | wood |
| sandpaper | oak tagboard |

Bag B

| | |
|---|---|
| bond paper | water-color paper |
| onion-skin paper | glossy paper |

Bag C

| | |
|---|---|
| felt | silk |
| cotton cloth | wool |

Did you decide? Because next we're going to tell you what we think...

Do you agree that Bag A is the easiest? All the textures there are quite different from one another. Bag C is next, with all four textures being somewhat similar (all "cloth"). Bag B is the hardest, because the textures of different kinds of papers are more similar than the different cloths and are very difficult to distinguish from one another.

But what can you do about applying this objective to your classroom? Diagnostically, for example? (More about this later.) We think you should start with easy materials, Bag A for example. Then, if you find all the children able to handle it (certainly useful information), make the materials a little more difficult, say Bag C. If you're not so much trying to diagnose children, but trying to challenge a particularly interested child, let him or her work on becoming able to distinguish different kinds of paper by touch.

Anyway, the point is that most of the objectives we'll be working with are not easy or difficult in themselves, but depend in some way on the exact materials and the exact way you, the children, and the materials interact.

Let's try another objective, the sorting objective (4). How can we make this objective more or less difficult? The difficulty of that objective seems to depend on two points: the particular materials that are to be sorted and the labels that are to be placed on the piles. Because we have already considered one example where materials were important, we shall consider only the labels this time.

First suppose that the materials are: a piece of wood, a small piece of solid metal, a piece of paper, some cloth, a drinking glass, and a piece of plastic.

Which do you think will be more difficult to sort these materials into:

one pile for slippery
and the other for not slippery

or

one pile for hard
and the other for soft objects?

We think that slippery and not slippery will be a more difficult sorting task than hard and soft. Do you agree?

Think of some materials that would be very easy to sort into slippery and not slippery, but difficult to sort into hard and soft.

Write your list of materials here.

We've got more work for you to do. Look at objective 2 which has to do with ordering some materials from hard to soft. It tells you what the materials are. But of course you are free to change them to make the objective more or less difficult.

What are some materials that would make the task more difficult?

You can change the words, too. You don't have to use a range from hard to soft. What are some words that would make the task more difficult?

What are some materials that would make the task less difficult?

Words to make the objective less difficult?

Finally, carry through this same kind of analysis for at least two of the remaining four objectives: 3, 5, 6, and 7. That is, tell ways to make the objective easy or difficult.

**Weight: Which is Heavier? An experience with comparing weights**

This activity (actually it's a game) is neither as social nor as messy as oobleck. But you do need a partner and some materials to work with. Go around your classroom and collect about 20 different objects. They should have varying sizes and weights. Be sure to include some small heavy objects and some large light ones. You need some kind of double-pan balance, too (the kind with two pans; you put something in each of them and one side or the other goes down). Even a postage scale might work. Bathroom scales usually aren't sensitive enough. You can probably improvise something with a yardstick or meterstick and a pencil. But you really need a double-pan balance for children to work with, so try to borrow one somehow.

When you have everything, you and your partner should sit at a table with all these items on it. And the balance, too. One of you selects two objects, gives them to the other, and says, "Which one is heavier?" That person feels their weight and makes a guess. Then the first person puts the two objects in the pans of the balance to find out if the guess was right. If it was right, the second person (the one who guessed) may keep the objects in a pile near him or her. If the guess was wrong, the objects go back in the big pile. Now exchange roles. The second person selects two objects and gives them to the first person to feel and to guess which is heavier. Test and then either put back or retain in the first person's pile. Keep playing until no objects remain. Then the game has ended and the winner is....

Did you find some ways of picking objects that were likely to fool your partner? Explain what they were. Perhaps this gave you some ideas about other objects you would like to include.

Before we go on, write down a behavioral objective that describes some skill you were using in playing the "Which is Heavier?" game.

We will come back to this activity later.

### A Wordlist for Weight

There don't seem to be as many words for describing the weight of objects as there are for textures. Probably it's a narrower dimension. Anyway, here are some that we found. Can you add any?

heavy
light
dense
feather-weight
airy
buoyant
imponderable
weightless
light as thistle down
cumbrous
massive
weighty
substantial
rarified

Think of some endings for the phrases "as light as..." and "as heavy as..."

Pick at least four of the words in the lists and think of as many objects as you can for each of them that would be described by that word.

Think of something dense but not heavy. What is the difference between being dense and being heavy?

### Developing a Checklist of Objectives for Weight

The game you played suggests the skill of making comparisons of the weight of two objects, whether or not the heavier object is the bigger or smaller. The wordlist seems really to include only synonyms for heavy and light (disregarding the distinction between heavy and dense) so we want children to be able to use these two words correctly.

Finally, thinking of degrees of heaviness, we should expect children to place objects in order from heavy to light. Here, then, are three objectives for perception of weight:

The child should be able to:*

COMPARE

8. Given two objects of different weight and the opportunity to pick them up with eyes either open or closed, tell which is heavier (whether or not the heavier object is larger or smaller than the lighter one).

DESCRIBE

9. When asked to describe the weight of an object, respond appropriately using the words heavy, heavier than, light, or lighter than.

ORDER

10. Given a set of objects of differing weights, place them in order from light to heavy.

*See pages 22-23 for the earlier seven objectives.

Which objective(s) was involved in the "Which Is Heavier?" game?

Order the three objectives as to how much verbal knowledge is required of the child. Explain your ordering.

Making the Objectives in the Weight Checklist More or Less Difficult

Just as with the texture objectives (there's a pattern), we need to talk about the ways of making an objective more or less difficult. We will do one for you and then you can try the other two. Look at the third objective below; it asks the child to order some objects in terms of their weight. We'll make a list of ways to make this more difficult and a list of ways to make it easier.

Ways to make ordering by weight easier

Select objects all of the same material
Select objects all of the same shape
Select objects very different in weight
Have the child close his or her eyes
Have only three objects for ordering

Ways to make ordering by weight harder

Select objects of several different materials
Select objects of several different shapes
Select objects all nearly the same in weight
Have the child open his or her eyes
Have lots of objects

Do you agree with our list?

Are there other ways you wish to add to it?

Now make similar lists for the other two weight objectives.

**Size and Shape: "It's in the bag"; an experience with size and shape**

You can either do this activity as a solitaire game or make up rules for playing with someone else.

You need a set of fairly small wooden or plastic blocks of various shapes and sizes. Attribute blocks, pattern blocks, or geoblocks from the Elementary Science Study series will work well. You also need two bags. And some Cuisenaire rods, if you have them. If not, you will need some straws.

Here are three simple activities to try:

1. Find two of each size and shape of block (color doesn't count) and put away the rest of the blocks. Put one of each block in the bag, leaving the others on the table. Pick up one of the blocks on the table and find its mate in the bag. Place them in a pair on the table. Now draw out another block. And so on, until all the blocks are out of the bag.

2. This is similar, except now put one of each type of block in each bag. Put one hand in each bag and keep drawing out pairs until you have taken out all the blocks. Was this easier or harder?

3. Do you have Cuisenaire rods? If not, cut up about 20 straws into about ten different lengths. Whatever you are using, dump them in the bag. Now try to draw out then rods or straws in order of increasing length.

Notice that none of these activities involved using shape and size words. Make a list of such words and modify at least one of the activities so that some of these words will be used.

Can you choose one of these activities and turn it into a simple game for two children?

**Wordlist for Size and Shape**

Here is a list of words for size and shape that we found. Add your words to ours.

flat
angular
curved
rounded
thick
circular
short
small
thin
long
square
pointed
triangular
full of holes
spherical
tiny
indented
protruding
cylindrical
boxlike
large

In the space below, form some pairs of opposites of shape words like thick-thin.

One use of a wordlist is to suggest materials to use with children. Let's try this with our size and shape wordlist. Look at the words on the list and let objects come to mind that have these qualities. Here is what happened when we tried this:

buttons
jars of various sizes and shapes
different-sized and shaped boxes
dowels
pencils and crayons of different lengths
kindergarten blocks
construction toys
paper cutouts
marbles and beads
cookies
clay objects

Now form groups of words that belong together because they describe the same kind of shapeness or sizeness or because they are alike in some other way. Give your groups names (like "Words for Small Things").

We left space for you to add your own.

## A Checklist of Objectives for Size and Shape

By now you should be getting the idea that in making a checklist of objectives, we consider the various behavior words (so far we have used: discriminate, compare, order, sort, describe, and classify) and see if they apply to the particular use of the sense we are considering. For size and shape we found we wanted to use the behaviors of identifying, sorting, and ordering (used previously) and two new behavior words, naming and tracing.

The child should be able to:

IDENTIFY
11. Given various shapes and sizes of blocks both in a bag and on a table, reach in the bag and pull out a matching block for each block on the table.

NAME
12. Given a bag full of blocks shaped like triangles, circles, squares, rectangles, and rhombuses (diamonds), name each block before pulling it out of the bag.

TRACE
13. Given a drawing of shape, trace around the outside of it with a finger or crayon.

ORDER
14. Given a bag of blocks all the same shape but of different sizes, pull the blocks out of the bag in order from largest to smallest.

SORT
15. Given a bag of blocks and some labels of different shapes, pull out of the bag all the blocks that belong with each label.

There is another objective that is needed for describing sizes and shapes. You should add it.

DESCRIBE
16.

Several times we have asked you to pick out objectives that don't ask the child to use words. We think it is important to recognize those cognitive skills that are nonverbal. Why? For two reasons. The first is that there are worthwhile nonverbal activities to do with children that are too often forgotten because we live in such a word-oriented world. The second is that some kinds of learning problems can be separated from verbal learning problems. Consider two children, neither of whom can reach in a bag and pull out a triangle when you ask him or her to do so. But the first child can pull out a triangle when you put another triangle in his other hand, whereas the second child can't even do that. Maybe the first child simply hasn't yet met the word "triangle." Probably the second child's problem lies deeper. Anyway, you need to know the difference. More about this in following chapters.

For now, once again pick out the objectives that don't use words. (But don't even these require the child to understand the words used to give him or her direction?)

### Making Objectives for Size and Shape More or Less Difficult

We hope you understand how to do this task now. In later chapters, we are going to use a more compact form for noting how to make objectives more or less difficult.

But for now, work it out fully as you did for the objectives about sensing weight.

| objective number | ways to make the objective easier | ways to make the objective harder |
|---|---|---|
| 11. | | |
| 12. | | |
| 13. | | |
| 14. | | |
| 15. | | |
| 16. | | |

## Diagnostics for Touch

It's been a lot of work to get this far in this chapter. We have been dealing in considerable detail with touch perception and we still haven't begun to talk about what you do with children. But now the payoff begins. In this section we'll talk about how you can find out to what degree certain children have already developed their skills, knowledge, and interests. In the next, we'll develop more activities relating to touch that you can do with children. And in the final section we'll suggest some directions to go on from there. The payoff will continue in succeeding chapters as you find yourselves progressing more smoothly and clearly as a result of having done this earlier work.

What do we mean by a diagnostic? First, here's what we don't mean. We don't mean a "test used to place children in a rank or give them a grade." Nor do we mean a technique for "finding out what is wrong with a child." We see a diagnostic as a technique to: (1) find out to what extent a child is involved in a particular area of learning; or (2) determine the method the child is using to function in a learning area. That is two purposes--level of involvement and method of functioning.

Here are examples. You need to know that Sarah and Sam spend a lot of time working with texture plates and that Sam really seems to be involved in some exciting learning with them. Walter, on the other hand, never goes near the texture plates, although he does use touch words a lot. This is a brief description of the level of involvement of three children with se[illegible]e perception materials. To go beyond this information to deter[illegible]ne the method of functioning, you become concerned with other questions: Has Sarah gotten stuck?; if so, where?; what can you lead her to next with the touch materials? Is Sam ready for some classification games? Has Walter already mastered all the skills in the touch area, or does he not go there because he first needs some preliminary work with someone? What is the significance of his using lots of texture words?

So much for purposes. How do you do diagnosis? We see two modes: observing and probing. Briefly, in observing you decide you will pay attention to certain kinds of things with your children and you take notes, perhaps by carrying around with you notecards for each child. In this mode the checklist of objectives serves to help you decide on what you will focus your observing so you become "ready to see" both the level of involvement of your children and how they are functioning.

By probing, we mean taking a child aside for some time and simply asking him or her a few questions, or perhaps spending 15 minutes working on some materials with him or her.

What are you going to do with the information you gather in this diagnostic process? If it doesn't help you work with your children, there is no point in taking up precious time and energy doing it. But for most teachers, diagnostic techniques serve a real function. One way to look at this function is to see that the technique can

provide answers to questions about what to do with materials and what to do with individual children. Here we have started these lists of questions, using sense perception as the example. You should add some questions to each list.

QUESTIONS ABOUT MATERIALS

In beginning work with sense perception, what should I first introduce to the children?

Are the materials I have introduced being used? If not, why not and what do I do about it?

Are these materials worth using again next year, or should I find new ones?

QUESTIONS ABOUT INDIVIDUAL CHILDREN

Where does this child like to spend time and what happens there? How can I enrich this time or use it for teaching difficult skills?

Are there areas that the child avoids because there's no way to get started? How can I help him/her get started?

Is this child learning the skills I had planned? If not, why not? And what should I do to help?

This has been a lengthy introduction to what we mean by diagnostic techniques. Now we can talk about how to make up and use diagnostics for perception of touch. To do this, we use the checklist of objectives for touch. That's one of its functions.

Let's first think about the observation mode. Look through the checklists of objectives again. You see several kinds of skills there--matching, naming, identifying, sorting, etc. The simplest diagnostic technique is just to take note of occurrences of these

behaviors. This is simpler to plan than to carry out. You have to really "tune in" to your children and their involvement with touch. Watch their hands when they are working. See the way they touch each other. Form an impression in your mind of each child. Is this someone who really loves to touch, or is this child afraid of touching things and people? Keep notes for a few days to go over in your training session.

From your notes, pick out three children who love to touch things and describe what you mean by that and how you know it. What do they touch? What do they say about touch?

texture words? You could have them tell stories about how objects feel, or form a ring where each person has an object and then go around the room using touch words. But the simplest way is just to ask individual children how things feel as you are working with them during the day and keep some kind of record on notecards. If you want to know something about individual children, you keep individual records; otherwise you can just keep a general record of class vocabulary for touch. Note that your children will soon get the idea that you are interested in their touching things and what they can say about that type of behavior.

List words that children in your class use to describe how things feel. Also include other interesting observations about their use of touch.

To do diagnostics in the probing mode, we need to pick particular objectives to work with. Let's start with objective 5. Here it is again:

DESCRIBE
5. Given an object, use at least two texture words when asked to tell how the object feels.

So this objective is about using texture words. What do you do to find out how your children use

Now we'll try to make a diagnostic for objective 8.

COMPARE

8. Given two objects of different weight and the opportunity to pick them up with eyes either open or closed, tell which is heavier (whether or not the heavier object is larger or smaller than the lighter one).

Here is a possible procedure. Choose some material. Two lumps of clay will work well. How different in weight should they be? At first make them very different so you can tell if the child is getting the idea. Go around the room while children are involved in some other activity and quietly ask one child at a time to hold out his or her hands and close his or her eyes. Put the lumps of clay in his or her hands and ask which is heavier. If you get a correct response, make the lumps of clay more equal in weight and try again. Try with eyes open. Try with a round ball of clay in one hand and a long snake of clay in the other.

Do this diagnostic with five children. Write what you found out here.

Let's do one more objective.

NAME

12. Given a bag full of blocks shaped like triangles, circles, squares, rectangles, and rhombuses (diamonds), name each block before pulling it out of the bag.

There's a natural for this one. Tell two children that you are going to teach them a game. Give them each a bag of blocks and have them sit opposite each other. Tell them to take turns reaching inside their bags and naming a block before pulling it out. If they can't do it at all, then

they need some learning experience with the names of shapes. Otherwise, they can play for awhile. You can come back later to see if they know all the names.

Do this game with at least three pairs of children. Write what you found out here.

## Creating Learning Experiences for Touch Perception

All the work we've done up to now (the wordlists, checklists, and diagnostics) is supposed to help in creating meaningful learning experiences for children. But the way that this happens varies from teacher to teacher. We will show you how it works for us (a model again) in the hope that these ideas will help you. In following chapters we will ask you to do this work and will generate some criteria you can use to tell whether you have done a good job or not.

WORDLISTS suggest materials and organization. We get the idea that everything in the classroom and outside it is usable material for touch activities. But some materials are more useful: blocks, texture plates, cloths, sandpaper, clay. From the first sorting of touch words we got the idea that there were really three aspects of touch to be concerned with: texture, weight, and size and shape. So we don't want to neglect any of these areas.

CHECKLISTS of objectives give us lots of ideas and focus on certain skills like identifying textures, naming shapes, and comparing weights. The objectives are not the learning experiences, but they strongly suggest them. The learning experiences themselves need to be more general, growing more from what is happening in the room and being more fun, than what the objectives alone suggest.

DIAGNOSTICS give you ideas about where to start. Some ideas for beginning come from noticing what children like to do--their involvement. Others come from discovering areas that need work with some children, or finding the skills that all of them already have and deciding what's next.

## Sandpaper Experiences

Here we describe one set of learning activities in considerable detail. We hope that you will try them, or some suitable modification of them, with your children.

These activities are suggested by the words "coarse" and "fine" on the textures wordlist. Objective 3 on ordering relates directly, whereas objectives 1 and 4 relate less directly. We would try these activities with children who we knew liked to work with sorting real objects and who we knew needed work with using the words "coarse" and "fine" and with developing finer touch discrimination.

### Materials

several sheets of sandpaper of four grades, ranging from very coarse to very fine; cut them into quarters

four shallow boxes for sorting the sandpaper labels

bags (cloth is best, but of course paper works)

Glue a piece of sandpaper of each grade onto the back of each of the four shallow boxes. Label the box on the outside with words corresponding to the grade of sandpaper--very coarse, coarse, fine, very fine.

1. Put out one or two pieces of each grade with a sign saying, "FEEL ME." Leave for several days, occasionally talking with children about the textures of the paper and introducing the words coarse and fine.

2. Show children the four sorting trays with the sandpaper pieces glued on the back. Bring out a bag with all the rest of the sandpaper pieces in it and ask children to sort the paper into the boxes. Don't require just reaching into the bag or working with eyes closed yet.

3. Try a sorting race with two children, each having half the sandpaper. They place their

pieces next to the appropriate box as fast as they can. Then they check each other to see if they were right.

4. Ask children to sort the sandpaper with their eyes closed (or use blindfolds if they are used to them).

5. Ask children to sort by reaching into the bag and calling out the name of the grade of sandpaper they are going to pull out. They work as partners, each taking a turn until they either make a mistake or finish the bag.

6. They try pulling out all the very fine pieces, then all the fine pieces, then all the coarse pieces, finally all the very coarse pieces. They can practice this task by themselves.

7. Try more grades of sandpaper (from a hardware store). As children use sandpaper for sanding, have them order the used sandpaper along with the unused pieces in terms of coarseness.

Encourage them to speculate about what is going on. Let them look at sandpaper or the surface of wood that has just been sanded, with magnifying lenses. Encourage them to sand scrapwood and feel how the texture of the wood changes. Are they curious about the numbers and words that appear on the back of some sandpapers? Can they bring other kinds of smoothing papers like garnet papers and emery cloth and wet/dry papers from their home woodshops? This group of questions and activities is to point out that, or course, you want to extend the work or allow it to take off into areas that interest the children.

On the next page, describe the parts of this activity that you tried in your class. How did your children react? Did you do any diagnostic work? Tell interesting anecdotes. Raise questions that came to you as a result of trying these activities. Describe where you would like to go next with touch activities.

## WHAT HAPPENED IN MY CLASSROOM WITH SANDPAPER EXPERIENCES

## More Touch Learning Experiences

There isn't space in this learner's guide to provide a "complete" set of exercises for teaching touch perception (let alone the other senses). Besides, you are learning how to provide them for yourself. But in this chapter we will give you some more ideas. One note before the list--often some of the most effective teaching about something like sense perception will come while you and your children's focus is on something else. For example, you and some children are sifting flour; all of a sudden you all start feeling how the flour becomes more powdery, you feel the insides of the sifter, you feel different kinds of flours, etc. You can hardly plan this kind of learning. But you can be ready for it to happen. We think the kind of work you are doing here will make you more ready.

Anyway, here is a random list of activities, waiting for you to develop and expand them.

1. Textures of liquids are really interesting. Have some jars of different ones around for just feeling, or sorting, or naming. Water and soapy water would be a minimum. But what about glycerin, rubbing alcohol, oobleck, molasses....? It all depends on how careful your children are. Anyway, be prepared for mixing, pouring, spills....

2. Introduce your children to the double-pan balance. Show them how you use it to check your guesses about which of the two items is heavier. They may have other interesting ideas about how to use it, but eventually they will probably get around to comparing weights. With lots of interesting objects around for weighing like clay, washers, toys, blocks, pegs, containers, and so on, they are sure to improve at sensing weight through touch, too. They could use both their sense of touch and the balance for sorting and ordering by weight.

3. Get children started with tracing the outlines of real objects and cutting them out. Include objects that have simple geometric shapes as well as more complex ones like hands, utensils, rope, pencils, scissors, etc.

4. Go around with several children and put up signs on objects in the classroom that say, "This feels..." Include items like the chalkboard, animals, bulletin boards, a person's clothes, metal sinks, or whatever strikes the children's fancy. Let them come up with a lot of the words, too.

5. Make a feely collage by pasting cloths and other textural materials onto a large piece of paper. You can include words for what you feel. Perhaps turn the words into a texture poem.

6. Play bag games with sets of blocks like the ones introduced earlier in this chapter. Also try "What is it?" games with other objects in the bags.

7. Begin feeling objects with other parts of your body besides your hands. Can you feel shapes with your feet, for example? Or compare textures with your arms?

8. San Francisco's Exploratorium has a tactile dome that is

really a sensual experience, a labyrinth, (totally dark), made of wonderfully textured materials. It's probably too scary for a class of very young children, but you might consider building a minature environment like it in your classroom.

Choose at least one of these ideas (or one of your own) and elaborate it into a set of activities for your classroom. Then try it out. On this page explain below what you planned, list the objectives you had in mind, and chronicle what actually happened.

USING TOUCH - WHAT I PLANNED AND WHAT HAPPENED

## Beyond Touch

We need to say a few words about how this work fits into a broader scheme. Recall the discussion in Chapter II about why we teach sense perception, about how important our senses are to learning. Our sense of touch is quite important. And it should be clear that you, as a teacher of young children, can do something to help children to use their sense of touch better and to value how things feel. But beyond that, you can see that you are also training mind skills as you work with children on touch activities. Classifying objects according to their textures helps children improve at classifying in other ways. And our world is full of classifications that we must make and use.

Then there are higher-order skills that depend on accurate sense perception, like the child's inference that the flour gets "more powdery" because the sifter puts air in it. Usually we don't talk about "teaching" inference, prediction, measurement, hypthesis making, and experimentation before grades two or three. But you know they are going on all the time in some informal way with younger children. And working with materials like those we have talked about for touch will increase the opportunities for children to try out these other skills. You can do a lot to encourage them, just by letting your enjoyment come out and by indulging yourself in some speculation about the powderiness of the flour or why sandpaper looks the way it does under a hand lens. We hope that the activities listed in the previous section gave you the idea that teaching sense perception isn't dull or narrowly limited to what is in those objectives, but rather offers an exciting chance to try new kinds of activities with children, or a new way to use art work or sand-table work.

## Check-up 3

Now it is time for you to check yourself to see if you have met the objectives we set for you at the beginning. Read through the Objectives for the Learner on page 19 again. You may feel that this chapter covered a great deal that isn't listed in those objectives. Right. But we don't expect you to have mastered everything yet. That will come in the following chapters.

Mostly you can check yourself simply by asking yourself honestly whether you think you can do the things listed in the objectives. But to make this learning more concrete, and to provide some basis for discussion in your training group, here are four self-diagnostics: (one for each objective)

1. Write a description about the way this guide feels to the touch. Now list the skills you had to use to write the description. Limit the skills to sense perception skills.

2. Choose one of the texture objectives that you didn't use on page 26 and list at least two ways to make it harder and two ways to make it easier.

3. Here is a diagnostic technique for finding out whether children can tell a coarse piece of sandpaper from a fine piece. Have two such pieces; then take a child aside, ask the child to close his or her eyes,

and hold out his or her hands. Ask the child to say which hand has the coarse piece of sandpaper. Do this diagnostic with two children in your classroom. Report your results.

4. Choose one of the learning experiences that you haven't yet tried with your children. It could even be one of the ones that you have tried yourself, like oobleck. Try it with your children. Report on what happened.

**Check-up Report**

# IV

# CHAPTER IV. TASTE AND SMELL

## Objectives for the Learner

When you complete this chapter, you should be able to:

1. Given an experience in which you have used the sense of smell or taste, list the cognitive skills you used that relate to that sense.

2. Given a behavioral objective describing a taste or smell skill, modify it to make it easier or harder.

3. Given a behavioral objective for a particular taste or smell skill, use it to design a diagnostic test for that skill, and use the test to find levels of use (proficiency) of that skill in your classroom.

4. Given one or a set of objectives for a particular taste or smell-related skill, develop a sense experience that will provide opportunities to develop that skill.

As in Chapter III, we have another underlying objective--to sensitize you to the world of taste and smell, so that you may find more delight in and do more serious thinking about the use of these two senses.

## General Plan

By now, you can probably predict much of the content of this chapter. From the title, you can tell it's about the senses of taste and smell. We grouped these two together partly because the use of them in our urban western culture is somewhat limited. If we lived in an agricultural or hunting community, either sense might be much more important. Another point about this chapter is that in it you will begin your part of developing a curriculum for sense perception. We're going to start out in Chapter IV by asking you to design diagnostic tools for assessing the development of taste and smell skills.

Later in the chapter, we'll ask you to design some learning experiences. (We will give you a model to work from, for both the diagnostic tools and the learning experiences.)

**Tasting and Smelling: An Extravaganza**

The starting place for this chapter is quite obvious. It's almost impossible to start working with the taste and smell senses without food, and certainly it would leave out a lot of fun. So here it is. Get together with other people in your training group, your co-workers, or your family and plan a feast. Naturally you'll want to keep it within everyone's budget; but given that consideration, try to include several distinctly different ethnic sources--an African main dish, say, with a Chinese desert, German salad, etc. Another way (especially on a low budget) is to make appetizers, or a luncheon smorgasbord. There are probably many recipes and some good cookbooks in your local public library--or borrow favorite recipes from the parents of your class.

Before you get too excited, and decide to make this a fiesta for your classroom or the whole school, wait a moment. You're going to have to do a lot of observing and note-taking, so you don't want too many people or distractions. But it's a great idea, and you can do it again later as a fine learning experience for the class.

When you get the meal organized, be prepared to do the following tasks. (We suggest that you limit the variety of foods somewhat, so you won't be overwhelmed by the taste and smell sensations, or by the number of things you'll need to take notes on.)

Before you start eating, put up a large sheet of butcher paper, a chalkboard, or some other surface where you can collect words. It's more fun than writing in your own notebook, because everyone can share their words. Along the side list the foods. Whenever you discover a new taste, or smell, and have a word for it, write it on the word collector. This may mean a lot of jumping up and down, but if you wait till after the meal, you'll never be able to keep everything straight. Sometimes you may experience a very distinct taste or smell sensation, but be unable to find a word or phrase to describe it. You might try using similes ("like..."), but be sure you make some kind of note about these experiences for which you don't have words.

Can you think of any reasons why there might not be word descriptions for all the sense experiences we have in taste and smell?

By the time you finish eating, you ought to have a word list that reminds you very much of the ones we provided for you for the sense of touch (see Chapter III).

Developing a Taste and Smell Wordlist

After your meal, give yourself time to relax, and then do some work.

Taste words are somehow different from the words we've encountered for touch. You may notice that there are many very distinct tastes--for example, strawberry ice cream is a different flavor from blueberry, and artificial strawberry is very clearly not real strawberry. But it would be very hard to describe in words

just how those flavors differ. It seems as though there may be so many distinctly different flavors that our language just doesn't bother to make up categories or groups for them. We do use one major classification system: sweet, sour, bitter, salty:* but beyond that, the tastes are all so individual that we simply identify the taste by using the name of the thing that tastes that way. Pork chops are pork-chop flavored, ice cream has lots of different flavors (and names) depending upon what it's made with, green peas taste like green peas (although all green vegetables have a vaguely similar taste that might be called "vegetabley"). Smell is not quite such a problem, but words still don't convey everything we experience.

An important point to remember then, in developing children's taste and smell skills, is that there is a lot more than words can describe. That suggests that naming tastes may have to correspond sometimes to naming the thing that has the taste, and also that discriminating taste may have to be largely nonverbal.

The list that follows is our list of taste and smell words. There are two kinds of words on this list, though. First come words that directly describe qualities of taste or smell (just as touch words described qualities of touch). But the second part of the list includes names of things that have a distinctive taste or smell.

*These correspond to distinct chemical differences that our taste buds can distinguish.

## List of Taste and Smell Words

Part I-Words That Describe Taste and Smell:

### Smell

perfumed musty fragrant fresh delicious pungent savory sweaty wet noxious sweet odorous scented sterile fetid putrid rancid spoiled rank stinky stale smoky smelly oily fruity moldy leathery

### Taste

acid sour sweet bitter salty bland acerbic spicy tangy stale weak strong full-bodied savory flat mild dainty juicy dry exquisite luscious gamey delectable flavorful tasteless toothsome appetizing palatable insipid gustable wishy-washy zesty licorice austere nasty after-taste milk and water lip-smacking tickle the palate relish ambrosiac flatter the palate turn the stomach nectar

Part II-Foods and Spices That Are Particular Tastes and Smell:

white potatoes sweet potatoes yams summer squash winter squash strawbery blueberry cranberry huckleberry persimmon grapes apples oranges tangerines tangelos lemons limes bread fruits grains vegetables dairy products roast beef steak short ribs sweet-and-sour pork onions garlic peppers chutney cloves nutmeg cardamom thyme cinnamon basil rosemary marjoram

Add your wordlist from the Taste and Smell Extravaganza to ours. Can you separate them into the two categories we used? If not, add a third one of your own.

## Checklist of Objectives for Taste

Now it's time to begin thinking about the objectives or the cognitive skills you want to develop in relation to taste and smell. You've already had three experiences with deriving skills objectives for one sense (in the chapter on touch). The objectives or skills were based on two notions: (1) the sense experience you had using that particular aspect of touch,

and (2) the wordlist that was compiled for each aspect of touch. So far, for the taste and smell senses, you've gone through one "sensational" experience, and you've been involved in generating a wordlist. So you have the material you need for developing the checklist of objectives. Go back and think about that meal you experienced. Look over the chart that you made. Do you find words that name a taste or smell? That suggest degree or order of sensation? Compare or contrast sensations? Are there groups of tastes or smells that somehow seem to belong together? That describe similar qualities of taste or smell? Do you find that the whole sense area of taste has as wide a range of discrimination as touch or is the range narrower? Can you think of any reason why this might be true?

Here is the set of cognitive skills that we have been emphasizing:

Identify compare/contrast discriminate predict name group classify explain match sort order

Now look at the Wordlist. Do you find any of these or some additional skills that are reflected in the taste and smell Wordlist?

Below are the skills that we found and the reasons they seemed important to work through with taste and smell.

IDENTIFYING--it seems useful for young children to be able to identify tastes that are sour, bitter, salty, and sweet (those, you remember, are the four "tastes" for which the tongue has receptors). Identifying involves picking out something that has a particular quality (e.g., sourness).

NAMING--it also makes sense that children should be able to name the taste, within those four taste categories (e.g., this tastes... sour). Or they might name the

food itself, since the name conveys a particular taste (e.g., hamburger taste).

COMPARE/CONTRAST--this means use of the qualities "sour," "sweet," "bitter," or "salty" as ways to say which one of several objects has more or less of the quality. (One is more "salty" than another. Also, here is a salty one and there is a bitter one.)

GROUP--put all those you think belong together in one place. This might be a good skill for taste; children could sort out all the sweet foods in one place and all the salty ones in another.

SORT--in sorting, the teacher provides the name of the category, or indicates it in some other (nonverbal?) way. For example, a box with dividers that fit only one shape button. The child then decides where each object belongs. Children could sort by taste or smell. Sorting, unlike grouping, requires that the child use your criteria for separating categories.

DISCRIMINATE--discriminating is much like comparing, except that the child needs to be able to pick out a particular quality that you've identified (say, saltiness) and find the object that is like that quality. For example, there are two bowls of powders on the table. The child is asked to bring you the one that tastes salty. One has and the other lacks that quality. Smells can be similarly discriminated.

CLASSIFY--in classifying, the child takes a set of objects and first puts them into groups of her/his own choosing. Then she gives each group a name, on the basis of some quality that characterizes the objects in that group. For example, a child might take all the ingredients for baking chocolate chip cookies and put them in groups called "good tasting," "bad tasting," and "not much taste." (You might think wet/dry offers a more appropriate classification, but your opinion doesn't count here.)

ORDER--it is possible to order objects according to some taste quality for example, from sweetest to least sweet. A South Indian restaurant we know asks their customers to request curry according to a scale ranging from 1 to 5, mildly seasoned to almost impossible to swallow.

PREDICT, INFER--this is the beginning of more sophisticated thinking skills. We use taste to make predictions when we say, for example, "that butter won't be good much longer." A common inference using the smell sense is "where there's smoke, there's fire." Usually what we're indirectly referring to are changes in the chemical composition of something. That's science....

From these cognitive skills, we've selected a Checklist of objectives for taste and smell. We chose the ones that seem most appropriate for young children and that seem to work well with and be important to taste and smell.

Checklist of Objectives for Taste and Smell:

1. IDENTIFY
   Given a number of different foods, the child can identify those that are salty, bitter, sweet, and sour, if given the instruction, "Find the salty one," etc.

2. NAME
Given a number of different foods, the child can name each one's taste quality as salty, bitter, sweet or sour.

3. NAME
Given a number of different common foods, with eyes the child can name them by use of taste and smell.

4. GROUP AND SORT
Given a number of different foods, the child can group them according to his or her own criteria, or sort them according to the teacher's taste or smell categories.

5. DISCRIMINATE
Given a number of different foods, with eyes closed the child can discriminate one food from another by taste (or by smell). The teacher provides the names of the foods.

6. CLASSIFY
Given a number of different foods, the child can classify them according to his or her own taste (smell) categories. (The categories must be verbalized.)

Which of these objectives was important in the Taste and Smell Extravaganza? Which of these objectives does not require the child to use any words except those he/she may think up?

Remember how much work we did in Chapter III on modifying objectives to make them more difficult or easier. Pick out one of the taste/smell objectives and specify two sets of materials for using it. One set is for a child who seems to have limited experience with taste and smell; the other set is for a child who has already had a lot of such experiences. Now modify two more objectives the same way.

| | Easy Materials | Difficult Materials |
|---|---|---|
| Objective ____ | | |
| Objective ____ | | |
| Objective ____ | | |

You may have realized that, in the process of filling out the chart, you were also making these two objectives operational. That is, you were making them usable either as competency tests or as the basis for more diagnostic work. That's the purpose of the following section.

## Developing Diagnostic Tools

Just to keep this diagnostic business very clear, let's go back and review the difference in function and form of (1) objectives, (2) diagnostic tools, (3) competency tests, and (4) sense or learning experiences. Write down here what you think each of these is, and how it's useful to teaching (and learning).

1. Objectives (behavioral or otherwise):

2. Diagnostic Tools:

3. Competency Tests:

4. Learning Experiences:

If you're unsure, look up our definitions in Chapters II and III; then write your own definition here.

Back in Chapter III we talked about how the objectives help you decide that you are going to pay attention to certain kinds of things, and the diagnostic tool gives you the way in which you pay attention. Two methods of gathering diagnostic information were suggested: (1) observing and (2) probing. Both involve paying attention to specific children and to specific objectives, and both require some kind of note-taking to keep track of what you learn. Probing is a more direct, but also more isolated, way to learn about your children; whereas observing may not answer the specific question you had in mind, but may give you a wealth of unexpected information. So a combination of both diagnostic procedures seems useful. Remember that a diagnostic tool (as we use it in this guide) is a technique for finding out (1) to what extent a child is involved in a particular area of learning, and (2) at what level, or with which cognitive skills, a child is functioning with particular materials or a particular sense.

You've done several observations by now, and used the probing method a couple of times. To make sure that you have each clearly in mind, write down in the space provided below a brief description of how you would use them--the setting and the purpose. Why would you choose one instead of the other?

| Method | How you use it | When would it be useful? |
|---|---|---|
| Observation | | |
| Probing | | |

Go back and read the Diagnostics for Touch section in Chapter III. Pick out two of the questions (on page 36) about observing sense materials and the child's level of involvement and skill in using them. One question should be about the materials, the second about a particular child. Be sure you reword these questions so that they apply to the taste or smell sense. For example, the second question in the materials section could be reworded as, "Are the materials on taste perception being used? If not, why not, and what can I do about it?"

Suppose you decide to do an observation to find some answers to that question. Here's one way you might do it using the observation mode. Make up a set of note cards or a chart you can carry around with you. On the cards or chart you could put the following headings (this one is in chart form; you could easily change it to fit on note cards). Set aside about ten minutes a day for three days during a week to observe.

TASTE AND SMELL MATERIAL TO BE OBSERVED

| | |
|---|---|
| cooking area | What former taste and smell activities did they continue? |
| Number of children using material | What new taste and smell activities did they initiate? |
| Do they seem very involved? Were they there very long? | What additional taste and smell materials would have been of value? |

Now take the two questions you chose from Chapter III and write out a format for doing an observation to get some answers to them.

Format, Observation 1:

Format, Observation 2:

That takes care of the observational mode for diagnosis. Let's look at the probing mode. Chapter III made the point that the probing mode requires the use of particular objectives from the Checklist. In general, observation is a useful technique when you want to get an impression of what's going on, and perhaps come upon some unexpected conditions. Probing is more directed at very specific questions for which you want very specific answers. The Checklist of Objectives that apply to taste and smell are the source of just such specific questions. Let's see if we can do one as an example.

Objective

5. DISCRIMINATE
   Given a number of different foods, with eyes closed the child can discriminate one from another by taste (teacher provides name of food).

Do you know why this objective requires that the child's eyes be

closed? Remember that this chapter is about developing taste skills.

We plan to use this objective in a probing mode to find out children's involvement and level of skill. Probing means that you need to be able to take aside one or two children and work with them directly, to find out about those two things. You will also use your experience in making materials easier and harder when you work with this objective as a diagnostic tool.

Suppose you give Jenny five foods after she's closed her eyes and ask her to tell you, by taste, which one is the peach, which the hamburger, the apple, the candy bar. Let's say she gets them all easily except the peach. What might you assume? One possibility is that she doesn't eat peaches very often. Another is that she isn't very sure of the name of that fruit, although she certainly doesn't mistake it for an apple. You need to make that kind of determination with whatever information you're getting, or from what you already know about Jenny.

Suppose you decide that Jenny is actually quite capable of making gross taste discriminations and the peach is just a fluke for her. Now you may want to find out whether Jenny can handle less obvious discriminations. Make a list of five foods that you might choose to do this:

If you try out that set of foods with Jenny (or some other child) and find she has difficulty in discriminating among them, then you have a clear indication of an area that Jenny needs more time to work with. (Remember that this may not mean sitting her down and "teaching" her the difference in taste between two similar foods; it may simply mean more time for general taste experiences.) On the other hand, if Jenny whizzes through the second taste discrimination diagnostic, you may want to find out more about her progress with other taste skills.

Go back to the Checklist of Objectives for taste and pick out one that you think would be interesting to use as a diagnostic.

Write the objective here:

Now explain how you would use it as a diagnostic. Here are three steps you should include in your explanation:

1. The problem (based on the objective) you would give to a child.

2. Follow-up procedure (if the child easily solved the problem).

3. Follow-up procedure (if the child had difficulty with the problem).

Be specific about the materials you would use and how you would use them.

Do you think any of the objectives in the Checklist are harder than the others? Would you expect children to need experience (and perhaps some competence) in one cognitive skill before they could be expected to handle some of the others? For example, would you expect a child to be able to classify foods by taste or smell qualities who wasn't able to name or discrminate them? This is a tricky question, because not all educators agree on the answer. Also the difficulty of the materials may make a basic skill like "naming" more difficult than one like "classifying." Mostly you should think about this question and, as you go on working with children, see what you conclude.

Now, keeping in mind the work you did with making a diagnostic tool easier or more challenging, choose two more objectives from the Checklist and repeat the process you followed for the previous objective.

DIAGNOSTIC:

1. The problem you would give the child (include specific materials).

2. Follow-up procedure (if the child easily solved the problem).

3. Follow-up procedure (if the child had difficulty with the problem).

At this point, you should sit down with your instructor and go over the three diagnostic tools that you've designed. Your instructor will ask you to pick out three children in your classroom with whom you can do two of the three diagnostics. In the space provided below, describe what happened with each child, and how you would use the information you obtained to plan learning experiences for that child: (In what order do you think you should present the problems?)

CHILD 1

| Problem Presented | Results of First Procedure | Results of Follow-up Procedure |
|---|---|---|
| Problem 1 | | |
| Problem 2 | | |

CHILD 2

Problem 1

Problem 2

## Creating Learning Experiences for Taste and Smell

In Chapter III we went through the steps of creating a learning experience for texture (using sandpaper), and then described briefly a number of other learning experiences.

Now it's your turn to design a sense experience for children using the taste and smell senses. To give you some help, we'll start by asking you to use a taste and smell experience you've already had. You've probably thought of this yourself: adapt the Taste and Smell Extravaganza (you did it at the beginning of this chapter) into an experience you could do with young children. What are some things you'll have to change because they work with adults, but not children? We thought of several:

1. You should first do simple taste and smell experiences, so that the children know how to focus on those senses.

2. You probably don't want to include too many different foods--because that might be overwhelming.

3. You may need a different way of collecting the taste and smell words--an adult could write them down as the children think of them or you could tape-record them. In any case, don't forget that this experience is very verbally oriented.

4. You might want to get into categorizing types of smell and taste words (don't forget about similes, like "as yummy as.....").

5. What do you think you should do when someone says, "I tasted baked potato"? How do you handle this as a taste "description"? We found we wanted to include this way of describing taste (because there are such a mulititude of tastes, but also to encourage the recognition that one is naming and the other describing).

In the space provided, describe how you would do this activity with your class.

PLAN FOR TASTE AND SMELL EXTRAVAGANZA

Show your plan to your instructor and discuss it. Now you're ready to try it out with your children. (You may want to do it with one small group at a time.)

In the space provided below, describe what happened when you tried the Extravaganza with your class.

TASTE AND SMELL EXTRAVAGANZA: WHAT ACTUALLY HAPPENED

We're going to give you a little more help before we ask you to design your own sense learning experience. Here's another description of a taste and smell learning experience. You can use it as a model from which to design your own.

**Mystery Powders (or liquids):**

This activity can be done by one child or by two small teams of children.

1. Get a number of different, but somewhat similar-looking powders (or liquids) and put them in unmarked containers. Some powders you may use are sugar, powdered mild, cornstarch, or flour.

2. The object of the activity is to identify the mystery powders (or liquids) by tasting and/or smelling them.

3. Give half of the powders to one team and half to the other. (You can also make up two sets of each powder, so each team has samples of the same substances.)

3. To make the identification easier, you can also put on the table a marked container of each of the mystery powders. To make the game harder, don't put any marked containers on the table. A "judge" can check the powders against the marked containers. (This role could be performed by a child who's become proficient at identifying unmarked powders.)

4. You might want to have the teams mark each of the containers they identify (with masking tape and a felt pen, for example) or keep a chart with their guesses, and the taste and smell clues that support them.

Variations:

1. This activity can be done as part of a cooking project. If done while cooking, you should choose a recipe that the children have used previously several times, so they can concentrate on the powders. If two different groups are cooking, it's fun to see which one comes up with something closest to the intent of the actual recipe.

2. In addition to keeping track of smell and taste clues, you might also allow touch clues. Keep a chart of clues to identification provided by all three senses.

3. You can make the game more or less difficult depending on what powders you use. Here's a list of some powders (all harmless if ingested): cornstarch, flour, powdered milk are all very much alike; sugar and salt are less similar; powdered pudding (vanilla), baking powder, and baking soda are also interesting to use.

4. You can make a list of liquids that would be fun for Mystery Liquids.

Criteria for Developing Learning Experiences

We use several criteria in developing a learning experience. The first one is that it should be fun for children, and that it should include as much detail and variation from the real world as we can

provide. There aren't just four or five different kinds of buttons to be found, there are hundreds; it's not until you begin to realize just how many different kinds there are that collecting or categorizing becomes a real challenge. It's also important to include the rare or otherwise special ones. Just watch yourself on a beach someday--the clam shells quickly become trivial and the real effort goes into hunting down a star fish or sea urchin.

A second criterion is that the learning experience in some way use the words from the wordlist. Look at the activity described above and then look at the wordlist for taste and smell. How many words from the wordlist do you think might be used in identifying the mystery powders?

A third criterion is that the learning experience relate to at least one of the objectives in the Checklist. Which of the Checklist objectives are important in the Mystery Powders experience?

A fourth criterion is that you can use the learning experience to do some aspect of diagnosis (either observation or open-ended probing). You don't need to actually use the learning activity for dianostic purposes, but if it's a good experience it could easily give you diagnostic information. So, for example, the Mystery Powders activity would tell you a lot about your children's ability to name, discriminate, identify, or group by taste if you chose to use it that way.

We use these criteria in our model for developing learning experiences; it's not the only model, and you may think of other important criteria for deciding what is a meaningful learning experience. For the purposes of this guide, though, we'll ask you to follow the model we've given, and check to see that the learning experiences you design can meet the four criteria. If you feel strongly about an alternative model or additional criteria, we suggest that you discuss it with your instructor.

Here is a list of possibilities for creating learning experiences about taste and smell. Choose one and write it out as if you were going to use it with your class. Then make a list of your own and write two activities as you would do them with your class.

1. Cooking projects of all sorts, particularly a basic recipe with slight variations. In one classroom we know, groups of children made pancakes three days a week. Each group varied the recipe slightly--blueberry and strawberry jam, honey instead of sugar, etc. They kept records of each variation, with words for how the taste and smell differed. At the end of the year, they made a book of recipes, accompanied by the taste and smell words.

2. Going on a smell-collecting walk. What sort of techniques might you use for collecting or recording smells? How many different smell "environments" can you locate?

3. Experiments with animals to see if they can find they way through a maze to find food. Are they using they sense of smell or some other sense? Is it better than yours? What about a maze for people?

4. Experiments and record-keeping about smells associated with changes: burning, molding, fermenting, cleaning, etc. Be sure you avoid burning plastic or smelling other harmful substances.

5. Can you play a game of smell Hide and Seek? The person who hides takes a perfumed or other strong-smelling object with him into hiding. Players try to locate him by the smell.

6. Grow an herb garden in your classroom, and experiment with using the herbs in various foods. Keep a record of which herbs seem to taste good together.

That's the end of our list. What did you come up with?

Don't forget to write out one learning experience from our list and two from yours, as if you were going to use them with your class. Be sure to describe how each one satisfies the four criteria.

Learning Experience 1

Learning Experience 2

Learning Experience 3

Now choose the one you like best and try it in your classroom.

## Check-up 4

Go back and look at the objectives for Chapter IV (listed on page 47). We've covered a lot of material in this chapter, but in the check-up you're responsible only for the material included in the objectives.

1. Pick one of the taste or smell learning experiences in either your list or ours (see pages 64-65). Go through the experience yourself. Then list the cognitive skills that you used as you tasted and smelled.

2. Choose one of the objectives from the Checklist (page 52) for taste and smell, and write it two different ways--once making it harder, and once making it easier.

3. Choose one of the objectives from the Checklist and write it as a diagnostic. (You can use the same objective as in 2 above if you wish.)

4. Choose one of the taste or smell learning experiences that you wrote up and try it with your class. Write a detailed account of what happened, including how you would do it differently next time, what you especially liked about the way it worked, and what cognitive skills were used by the children while tasting and smelling.

# V

## CHAPTER V. HEARING

### Objectives for the Learner

After working through this chapter, you should be able to:

1. Given a wordlist relating to a particular sense area, use the specific criteria given in this chapter to evaluate the wordlist.

2. Generate a wordlist for a given sense area that meets the word-list criteria given in this chapter.

3. Given a sense area, generate a checklist of objectives for that sense area using a wordlist and skill words.

4. Evaluate a given checklist and revise it to meet criteria which you have developed.

Before we begin, take two minutes. Close your eyes and pay attention to the sounds you hear, making a mental list of them.

Write as much of your list as you can remember here.

What did these sounds convey to you? Were there sounds of language? Emotions in the sound? Patterns? Moods? Music? Was there silence? Could you hear your own body's sounds? Obviously we don't need to tell you the importance of the sense of hearing.

More than in previous chapters, the ideas for including hearing as a sense in your teaching are going to come from you. And from your training group. So you won't find this chapter as it stands now a guide for teaching sound perception. But, after you have worked through it, and if you and your colleagues and the instructor pool your ideas and write them down, you will have a manual, a unique one, developed by you.

The help that we will provide comes again from the model for curriculum development we have been using all along. We need to stress again that this model (wordlists, checklists, diagnostics, and learning experiences) is not the only one; rather, it is one we find works best for us. And so we continue to ask you to adopt it provisionally for the work here. Perhaps you are becoming more aware of your own model or method as you discover the limitations of ours. If so, that pleases us, for we believe that in becoming more conscious of the processes used in life and work, people can make them better suited to what they want.

Now let's get started.

**Sound Scavenger Hunt: An experience using Hearing**

This activity works best with two pairs (at least) of people, but if you can't assemble that many people, work with one other person. You need to be in an environment fairly rich in sound-producing materials--like a classroom, a kitchen, or outdoors. You may wish to have a cassette tape recorder.

What to do: You and your partner are to collect the sounds on the list below and bring them back to share with the rest of the group (or to go over again by yourselves if you are alone). You may do this by bringing back the materials to make the sound, or a recording of the sound, or a description of the sound, or some combination of these:

the sound of something moving
a very loud sound
an angry sound
a pleasing sound
a musical sound
the sound of silence
a sound that changes
a body sound
sounds in two other categories that you create

As you share your sounds or go over them, think of ways to describe and compare them. You can include words that describe sounds--whistling, booming, dissonant. Or words that are sounds--ugh, sssssss, quack. Or kinds of sounds--a cry, a tap, a wail, a sigh. Or categories of sounds--percussive sounds (there are so many kinds of these!), noise, melodic sounds, quiet sounds. Or words that describe the tempo and change of the sounds--quick, undulating, pulsing. Really get into it; there's a lot more here than you might think at first.

**Wordlist for Sound and Hearing: Criteria for Completeness**

This is really a continuation of the work you started in the sound scavenger-hunt activity. But now expand your field of word hunting to any sounds you can think of. Let your inner ear range far and wide--music sounds and words, words that describe the sounds of instruments, the tempo and mood of music, the sounds of storms and rivers and other nature sources, words that bring to mind the sounds of the city or of the country, words that describe sounds people make, words to describe the changes in sound, words that describe the absence of sound.

Now we need to talk about ways to know when you have done enough wordlist generating. Why are we making this list anyway? It is to suggest the range of possible experiences and skills that relate to our subject area (sound and hearing in this case). So you have done enough when you have covered all the dimensions of sound and suggested the range of these dimensions. Let's formalize this into two criterion statements.

Criteria for completeness of a wordlist

1. Are all the categories of words in the subject area represented?

2. Is there a wide range of words in each category?

We don't mean to make too much of this issue; you have probably been applying these criteria implicitly all along. But let's see how to check your list of sound and hearing words. You will know if the wordlist is useful if it makes you think of more words.

Categories are names for groups of words. For example, "loudness words" is a label for a category. We should be able to think of words that belong in each category. The words loud, soft, strident, peaceful, quiet, roaring, and tiny all suggest some kind of loudness (or softness) and so belong in this category. Of course, that isn't to say that they won't belong in some other categories, too. The word "roaring" could belong to animal sounds and storm sounds, too.

In the chart below, list categories for your sound words and include some examples for each category you decide on.

| category | word examples |
|---|---|
| | |
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How do you know when you have exhausted the possible categories? Don't worry about it. You can't exhaust them; there are always more. We have made quite a hobby of collecting sound words; and the further we get into it, the farther we can see that we have to go. But you expand your own list by going to other sources: the backs of record jackets, sound poetry, a thesaurus, your friends, and the children in your class.

Now look at all the words you have that fit into each category. For example, suppose one of your categories is "pitch words." Well, pitch ranges from high to low. Do you have words that suggest this full range? Suppose you found you had:

| | |
|---|---|
| shrill | sharp |
| high | flat |
| mellow | tinkling |

What's missing?

It needs more words for low-pitched sounds. So you add:

| | |
|---|---|
| low | bass |
| rumbling | booming |

Do this for each of your categories; that is, describe to yourself the range of each category and test your list for completeness along this range. Where you find the list deficient, add more words.

## A Checklist of Objectives for Sound and Hearing and Criteria for Completeness

Until now we have always given you a fairly complete checklist of objectives for each sense area. But in this chapter, we will primarily ask you to do the development of objectives yourself. We think that you will find you have the tools to do this task and that you won't find it at all difficult. As aids, you have as models the wordlist you just developed, plus its categories, and the checklists of previous chapters.

First you need a list of all the skill words used in the checklists of the preceding two chapters. These are the words that appear directly above each objective. Write this list here: it begins with "discriminate."

You can see that these skill words (or most of them, anyway) will apply to hearing as well as they did to touch and smell and taste. One way to see this is to form juxtapositions of skill words and categories. For example, suppose one of your categories is tempo.

Then we form two phrases:

discriminate tempos

order tempos

Finish the above list.

Each of these phrases may contain the core of an objective. "Discriminate tempos" becomes:

Given the sound of drums pounding or sticks clicking at different rates, the child should be able to discriminate the tempos by saying which sounds are fast, slow, or medium.

Similarly, "order tempos" becomes:

Given several segments of music, either recorded or produced by someone else, the child should be able to order these phrases from fast to slow.

Some of the phrases on your list may not suggest an objective to you. Or you may not think some appropriate for your children. That's fine! What's important is that you begin to get some ideas.

Continue constructing objectives from the two-word phrases for the category tempo.

You are now at an exciting point, that of deciding what areas of sound and hearing to include in the "curriculum" for your classroom. Obviously, you can't work with everything that is on your list of categories. But you can choose some of them. Choose three or four of your categories and continue the process of writing objectives for these categories.

In your training group, compare lists. See if there are important objectives that some people have which you also want to have. Some people may wish to argue that some categories are more important than others and should be included preferentially.

Criteria for Checklists

How do you decide whether your checklist covers all that is appropriate in terms of sound and hearing for your children? How do you decide whether individual objectives are worthwhile?

As you have been constructing your checklist and discussing it with your instructor and training group, these two questions must have been on your mind. Make a list of criteria that answer them. Try to be specific. Think of reasons why you rejected one objective but included another. Reproduce your list here.

## Diagnostics for Sound and Hearing

Observational Mode

Recall that in the observational mode of doing diagnostics, you are collecting information about your children as they carry on normal activities. You are especially trying to determine their level of involvement and, where it comes up, their level of functioning.

Look over your wordlist, categories list, and checklist. Think of questions you should have on your mind or points to look out for both while preparing for teaching sound perception and while you are teaching it. We have started this list for you. You should add at least eight items.

1. Who are the whistlers and spontaneous singers? Which of these can carry a tune?

2. Who loves to make sound effects (e.g., while a story is being read)?

3. Who has trouble hearing (understanding) or pronouncing certain words?

4.

Choose two of your observational questions and make a conscious effort to use them during two classroom days. Write what you find out here.

1. Observational Question

What I found out:

2. Observational Question

What I found out:

3. Something else in the area of hearing and sound that I noticed about my children:

Probing Mode

Here you are more able to assess a child's level of functioning. Recall your work in Chapter IV in constructing this kind of diagnostic. List below diagnostics for your checklist, at least one diagnostic in each category in which you make objectives. (You may find that, as you think of effective diagnostics, you want to add or revise objectives. That's both good and natural. This kind of work is always circular and never-ending.) Remember to include procedures for what you do if a child finds it easy and what to do if a child finds it difficult. Here are two examples:

Example 1

(See "discriminate tempos" objective of page 74.) If you have children, while sitting in a circle, do rhythm work together. You beat sticks at varying tempos, asking each child in turn to tell whether the sticks are going fast, medium, or slow.

For children who find this very easy, vary the kind of rhythm as well as the tempo. For children who find it hard, make the slow tempos even slower and the fast tempos even faster and more animated.

Example 2

(See "order tempos" objective, also on page 74.) Follow Example 1, but now play three segments at different speeds and ask children to say which was fastest and slowest. Note those children who are hestitant to do this ordering and work with them separately.

As in Example 1, you can make this more difficult by varying the rhythms, and easier by being more extreme with fast and slow.

Now you keep going here:

(Writing space continued)

Try doing all the probing diagnostics that you have devised on just two children. Pick two children who you think will show a great difference in results. Write your observations here.

Child 1

---

## Learning Experiences for Sound and Hearing

Probably you have plenty of ideas by now of activities to try with your children in this area. If you don't, let's see what help we can offer.

First you should certainly make a list of materials to use. Do that here. But before you start, look over the wordlist you made on page 71 again. As usual, we've put a few examples at the beginning.

shakers
tape recorder
piano
animals

Now, what are the kinds of activities that you can do with children which involve sound? Here is our list. Add your own ideas.

chanting
singing
rhythm with and without instruments
record listening
storytelling with and without sound effects
instrument making and exploring
sound collecting on a tape recorder
sound collecting by hanging objects

Given all these lists (you've actually developed twelve of them in this chapter), you should be able to write plans for at least a dozen learning experiences. Pick six of the best and write them here. See if you can have it come out so that all your objectives are covered somehow. Don't get too elaborate in your writing. Write just enough so that someone else could get your idea and plan a lesson from it.

Discuss and share your ideas with other members of your group. As you begin trying out activities in the classroom, report your results and revise and expand your list of learning experiences.

LEARNING EXPERIENCES

## Check-up 5

We can't really use the material on sound and hearing to do the check-up. So we have found some "new" senses for you to play with. Before you do this check-up, re-read the Objectives for the Learner at the beginning of this chapter.

1. One "sense" we haven't worked with extensively in this guide is the sense of balance. Here is a wordlist for this sense. Break the list into suitable categories and use the criteria on page 72 to comment on the suitability of this wordlist. Remedy any deficiencies by adding more words.

   upright
   falling
   swinging
   tipping
   stationary

2. Another sensory area we really haven't considered is that of sensing temperature. Generate a wordlist for this area to meet the criteria on page 72.

3. Use the wordlist in either 1 or 2 above to generate a checklist of objectives. Revise your list to meet criteria you developed on page 76.

# VI

## CHAPTER VI. SIGHT

### Objectives for the Learner

There are no specific objectives for this chapter. We have already listed (and we hope you have already mastered) all the teacher skills that we wished to develop. Then why include this chapter? Well, for two reasons: (1) as a practice ground for the skills you have been working on, and (2) so that you will have a teaching guide for visual sense perception once you have worked through the outline here.

As you work with children in a classroom, you cannot help but be involved with their visual sense perception. And you, almost inevitably, help them to become keener visual perceivers as you talk to them about their block building, read picture books to them, give them art projects, and lead them through movement. (And, of course, in the same way, though perhaps not to the same extent, you are constantly helping them to develop their other senses.) But there are at least two important reasons for thinking self-consciously about teaching visual sense perception. First, you can develop methods to teach visual skills more effectively. Second, you can find areas of visual perception that you are neglecting but wish to emphasize more.

### Experiences in Vision and Wordlists

Vision is a sense with many aspects. To establish a broad base from which you can work, there are three separate and very different experiences here. After each experience, you are asked to develop a wordlist from what you have done.

Color Chart - Have you ever looked through the charts in a paint store that are supposed to help you choose a color. Each page shows many shades and hues of the same color, ranging from light to dark and as mixed with several other colors.

And there are directions for how to mix each one. Try to make a chart like this yourself using tempera or acrylic.

Choose two colors, plus white or black if you are feeling adventurous. Use small trays, bottles, or lids for mixing colors. The idea is to arrange many shades and hues on a piece of paper in some orderly way. You may wish to name some of your colors or mark them so you know how to reproduce them.

Are you working with a partner? If so, then try this game. Each of you mixes a color and asks the other to match it as closely as possible. You may wish to tell your partner which colors you used. Keep things simple the first time by using only two colors.

Make a list of color, light, and visual texture words here. Some categories you should include are: shades, colors, hues, lustre, methods of making color, and texture.

MIRROR LETTERS- Some weeks ago we were carving rubber stamp letters from gum erasers. The difficulty of making each letter come out looking right impressed us. The problem is that you have to carve the mirror image of the letter so that the letter itself will come out when you stamp it on paper.

Try drawing mirror images of letters. Use a small hand mirror to check yourself. Make a complete alphabet. Write a message that will come out normally when viewed in a mirror. Keep track of which letters are easy and which are difficult. Write some of your observations about your experience here to share with others in your group.

What we mean to introduce by this Mirror Letters activity is the whole area of visual symmetry, geometry, and patterns. Make a wordlist for this area. Some categories to include are: kinds of patters, kinds of symmetry, shapes, and size words.

Mirror Movements - You need a partner and some space for moving. You are going to mirror each other's movements. To start, stand facing each other, a few feet apart. One of you is the first leader. As the leader moves, the other follows, always keeping yourselves in positions as though you were looking in a mirror. After several minutes, switch roles. You may find after awhile that neither of you is leading, or that you are both leading equally. Great! You've "tuned in" to each other. Make sure you stay at this mirroring for at least ten minutes.

Write a description here of things you noticed about the other person's movements.

Make a list that describes movement in general. Don't limit yourself to purely visual words. Include speeds, size of movements, directions, relative positions, energy (like forceful or weak), kind of movement (walking, running), and whatever else comes to mind.

More Vision Words - Are there other categories and words that fit into vision that we have so far left out? Go over the lists you have so far and revise and evaluate them in terms of the two criteria for wordlists on page 72. Add new categories and their words here.

## Checklist of Objectives

Have you begun to feel how vast the area of visual sense perception is? We think that the writing of objectives should be divided up among the members of your training group. One or two people may be assigned to each of the categories listed below. In your group meeting, share objectives, discussing their meaning, difficulty, and appropriateness. Use the criteria you developed on page 76. These should be especially useful in determining whether you have included enough, and whether individual objectives are worthwhile.

COLORS AND VISUAL TEXTURES

SHAPES AND SIZES

MOVEMENT AND SPATIAL RELATIONS

PATTERNS AND SYMMETRIES

## Developing Diagnostic Tools

Like objectives, the number of possible diagnostics for vision skills is vast. To make the work easier, divide up the writing of diagnostic tools among your training group. Don't forget to cover the four vision categories:

1. Colors and Visual Textures
2. Shapes and Sizes
3. Movement and Spatial Relations
4. Patterns and Symmetries

Your group will want to write two kinds of diagnostic tools for each vision category: (1) observational mode and (2) probing mode. In order to develop observational diagnostic tools, you need to have a set of questions about the materials being used and the child's level of involvement with them. (If you can't quite remember how to do this, go back to Chapter V and check the section on diagnostics, page 76.) Your whole training group may want to formulate these questions before you divide up in small groups to work on the actual diagnostic tools.

The space following is for writing down all the diagnostics your training group develops. You'll notice that the form asks for a follow-up procedure, as well as for the first diagnostic problem. Do you have a sense of the value of having a follow-up problem in your diagnostic procedure?

DIAGNOSTIC TOOLS DEVELOPED BY THE TRAINING GROUP

A. Colors and Visual Textures:

1.

a. problem (including materials to be used)

b. follow-up (if child solves problem easily)

c. follow-up (if child has difficulty with problem)

2. (as above)

3. (as above)

B. Shapes and Sizes:

1.

a. problem (including materials to be used)

b. follow-up (if child solves problem easily)

c. follow-up (if child has difficulty with problem)

2. (as above)

3. (as above)

C. Movement and Spatial Relations

(as in 1, 2, and 3)

D. Patterns and Symmetries:

(as in 1, 2, and 3)

When you finish writing the diagnostic tools, each person in your training group should select two to try with children. In the space below, write down the two diagnostics you're going to use in your classroom. (You may want to pick one in each of the two modes.)

| Diagnostic | Observational or Probing Mode |
|---|---|
| 1. | |
| 2. | |

Use these diagnostics with three children in your classroom. In the space that follows, write a description of what happened. Be sure to include any learning experiences you intend to provide as a result of the diagnostics.

## Creating Learning Experiences

Here we are, almost at the end of this sense perception guide. To conclude, you can use you imagination and your most pleasant memories to design experiences for developing cognitive skills related to the vision sense. Don't forget the four criteria, though.

The learning experience should:

1. be fun, and rich in the variety of materials presented,
2. make use of the Wordlist to suggest the dimensions of cognitive skills related to vision,
3. make use of one or more of the objectives on the Checklist, and
4. be useful in providing diagnostic information about the involvement level of your children with visual skills.

With those criteria in mind, write a list of five to ten ideas for visual learning experiences. Then choose two and write them out in detail, including the number of children to be involved and all materials (see the chart below). Notice that the chart asks you to explain how the experience fulfills the four criteria.

CHART OF TWO VISUAL LEARNING EXPERIENCES

Experience 1

1. Description of experience:

2. How it fulfills criteria:

a.

b.

c.

d.

Experience 2

1. Description of experience:

2. How it fulfils criteria:

a.

b.

c.

d.

e.

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The Laboratory is uniquely qualified to train adults in the use of media and in other educational technological areas. The professional staff has developed innovative capabilities in preparing multi-media training materials for professionals and in providing on-site training. A fully equipped multi-media [illegible] in the new Center for Educational Development includes a broad array of film, videotape, photography, and other modern communication facilities.

The Laboratory is a public non-profit organization located in the San Francisco Bay Area and supported in part by the Department of Health, Education, and Welfare.

The work of the Laboratory is governed by a Board of Directors appointed by the major educational agencies in the states of California, Nevada, and Utah.



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